

CLAIMS:

1. A cutting machine comprising:

a blade configured to cut a workpiece;

5 a detection system configured to detect a dangerous condition between a person and the blade;

a reaction system adapted to perform a specified action; and

a fusible member adapted to fuse to trigger the reaction system to perform the specified action upon detection of the dangerous condition.

2. A cutting machine comprising:

a support structure;

a cutting tool adapted to cut a workpiece, where the cutting tool is supported by the support structure;

5 a detection system adapted to detect a dangerous condition between the cutting tool and a person;

a reaction system adapted to perform a specified action upon detection of the dangerous condition;

a fusible member to trigger the reaction system to perform the specified action upon fusing of the fusible member; and

a firing subsystem to fuse the fusible member upon detection of the dangerous condition.

15 3. The machine of claim 2, where the dangerous condition is contact between the person and the blade.

4. The machine of claim 2, where the reaction system is a brake mechanism
20 and where the specified action is to brake the blade.

5. The machine of claim 2, where the fusible member is wire.

6. The machine of claim 5, where the wire has a diameter of less than
5 0.025 inch.

7. The machine of claim 5, where the wire has a diameter of less than
0.015 inch.

8. The machine of claim 2, where the fusible member is held in tension.

15 9. The machine of claim 2, where the firing subsystem includes at least two
spaced-apart electrodes adapted to conduct electrical current, and where at least a portion
of the fusible member is positioned to contact and extend between the electrodes.

20 10. The machine of claim 9, where the spacing between the electrodes is less
than 1.0 inch.

11. The machine of claim 9, where the spacing between the electrodes is less than 0.1 inch.

5 12. The machine of claim 9, where the spacing between the electrodes is less than 0.05 inch.

13. The machine of claim 9, where the electrodes are traces on a circuit board.

14. The machine of claim 2, where the firing subsystem includes at least one capacitor.

15 15. The machine of claim 2, where the firing subsystem includes at least one silicon controlled rectifier.

16. The machine of claim 2, where the fusible member is mounted in a removable cartridge.

5 17. A cutting machine comprising:

a support structure;

a cutting tool adapted to cut a workpiece, where the cutting tool is supported by the support structure;

a detection system adapted to detect contact between the cutting tool and a person;

10 a reaction system adapted to perform a specified action upon detection of the contact between the cutting tool and the person; and

a firing subsystem to trigger the reaction system upon detection of the contact between the cutting tool and the person, where the firing subsystem includes a capacitor to store charge and a switching system to release the charge to actuate the reaction system

15 upon detection of the contact between the cutting tool and the person.

18. The machine of claim 17, where the switching system is configured to release substantially all of the charge stored on the capacitor within approximately 100

20 microseconds.

19. The machine of claim 17, further comprising a fusible member to trigger the reaction system to perform the specified action upon fusing of the fusible member.

5 20. The machine of claim 19, where the firing subsystem is configured to melt the fusible member using the charge stored on the capacitor.

21. A cutting machine comprising:
a cutting tool;
a detection system adapted to detect contact between a person and the cutting tool;
and
a brake system including a brake pawl adapted to engage and stop the cutting tool when the detection system detects contact between the person and the cutter;

15 where the brake system includes a release mechanism adapted to selectively restrain the brake pawl from engaging the cutter until the detection system detects contact between the person and the cutter; and

where the release mechanism includes a fuse wire that is melted upon detection of contact between the person and the cutter.

22. A cutting machine comprising:

a cutter;

a brake adapted to stop the cutter, where the brake has an idle position and a braking position;

5 a biasing system adapted to urge the brake from the idle position to the braking position; and

a release mechanism adapted to selectively hold the brake in the idle position against the bias of the biasing system, wherein the release mechanism is a single use device.

23. The machine of claim 22, wherein the release mechanism includes a fusible member.

5 24. The machine of claim 23, wherein the release mechanism includes first and second electrodes connected to a current source and the fusible member electrically interconnects the electrodes.

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10 25. A cutting machine comprising:
a cutter;
a brake adapted to stop the cutter, where the brake has an idle position and a
braking position; and
an actuation system adapted to selectively move the brake from the idle position to
15 the braking position, where at least a portion of the actuation system must be replaced
after moving the brake from the idle position to the braking position.

26. The machine of claim 25, wherein the actuation system includes a fusible member that is melted to allow the brake to move from the idle position to the braking position.

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27. The machine of claim 25, wherein the brake and at least part of the actuation system are housed in a replaceable cartridge.

28. The machine of claim 25, wherein the actuation system includes an explosive device.

29. A cutting machine comprising:

a support structure;

a cutting tool adapted to cut a workpiece, where the cutting tool is supported by the support structure;

5 a detection system adapted to detect a dangerous condition between the cutting tool and a person;

a reaction system adapted to perform a specified action upon detection of the dangerous condition;

an explosive to trigger the reaction system to perform the specified action upon firing of the explosive; and

a firing subsystem to fire the explosive upon detection of the dangerous condition.

30. A mechanical release comprising:

an electrode system including first and second electrodes electrically connected to
a current source;

a fusible member electrically interconnecting the electrodes; and

5 an electrical gate system interposed between at least one of the electrodes and the
current source to selectively control flow of current from the current source to the at least
one electrode, where the fusible member carries a tensile load of at least 10,000 psi
between the electrodes.

31. The mechanical release of claim 30, wherein the fusible member has a
tensile strength of at least 100,000 psi.

15 32. The mechanical release of claim 30, wherein the fusible member is formed
from a material chosen from the group consisting of stainless steel and nichrome.

33. The mechanical release of claim 30, wherein the fusible member is spring tempered.

5 34. A cutting machine comprising:

a support structure;

cutting means for cutting a workpiece, where the cutting means is supported by the support structure;

detection means for detecting a dangerous condition between the cutting means and a person;

reaction means for performing a specified action upon detection of the dangerous condition;

fusible means for triggering the reaction means to perform the specified action upon fusing of the fusible means; and

15 firing means for fusing the fusible member upon detection of the dangerous condition.